SAMSUNG

MICROWAVE OVEN

BASIC : SMH2117S
MODEL: ME 21K6000AS
MODEL CODE: ME21K6000AS/AA

SERVICE Manual

MICROWAVE OVEN

FEATURES

1. Precaution
2. Specification
3. Disassembly and Reassembly
4. Alignment and Adjustments
5. Troubleshooting
6. PCB Diagrams
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PRECAUTIONS TO BE OBSERVED BEFORE AND DURING SERVICING TO AVOID POSSIBLE EXPOSURE TO EXCESSIVE MICROWAVE ENERGY

(a) Do not operate or allow the oven to be operated with the door open.

(b) Make the following safety checks on all ovens to be serviced before activating the magnetron or other microwave source, and make repairs as necessary:
(1) Interlock operation,
(2) proper door closing,
(3) seal and sealing surfaces (arcing, wear, and other damage),
(4) damage to or loosening of hinges and latches,
(5) evidence of dropping or abuse.

(c) Before turning on microwave power for any service test or inspection within the microwave generating compartments, check the magnetron, wave guide or transmission line, and cavity for proper alignment, integrity, and connections.

(d) Any defective or misadjusted components in the interlock, monitor, door seal, and microwave generation and transmission systems shall be repaired, replaced, or adjusted by procedures described in this manual before the oven is released to the owner.

(e) A Microwave leakage check to verify compliance with the Federal performance standard should be performed on each oven prior to release to the owner.

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1. Precaution

Follow these special safety precautions. Although the microwave oven is completely safe during ordinary use, repair work can be extremely hazardous due to possible exposure to microwave radiation, as well as potentially lethal high voltages and currents.

1-1 Safety precautions (⚠)

1. All repairs should be done in accordance with the procedures described in this manual. This product complies with Federal Performance Standard 21 CFR
2. Microwave emission check should be performed prior to servicing if the oven is operative.
3. If the oven operates with the door open :Instruct the user not to operate the oven and contact the manufacturer and the center for devices and radiological health immediately.
4. Notify the Central Service Center if the microwave leakage exceeds 5 mW/cm2.
5. Check all grounds.
6. Do not power the MWO from a "2-prong" AC cord. Be sure that all of the built-in protective devices are replaced. Restore any missing protective shields.
7. When reinstalling the chassis and its assemblies, be sure to restore all protective devices, including: nonmetallic control knobs and compartment covers.
8. Make sure that there are no cabinet openings through which people --particularly children--might insert objects and contact dangerous voltages. Examples: Lamp hole,ventilation slots.
9. Inform the manufacturer of any oven found to have emission in excess of 5 mW/cm2 ,make repairs to bring the unit into compliance at no cost to owner and try to determine cause. Instruct owner not to use oven until it has been brought into compliance.

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10. Service technicians should remove their watches while repairing an MWO.
11. To avoid any possible radiation hazard,replace parts in accordance with the wiring diagram. Also, use only the exact replacements for the following parts: Primary and secondary interlock switches, interlock monitor switch.
12. If the fuse is blown by the Interlock Monitor Switch: Replace all of the following at the same time: Primary, door sensing switch and power relay, as well as the Interlock Monitor Switch. The correct adjustment of these switches is described elsewhere in this manual. Make sure that the fuse has the correct rating for the particular model being repaired.
13. Design Alteration Warning: Use exact replacement parts only, i.e.,only those that are specified in the drawings and parts lists of this manual. This is especially important for the Interlock switches, described above. Never alter or add to the mechanical or electrical design of the MWO. Any design changes or additions will void the manufacturer's warranty. Always unplug the unit's AC power cord from the AC power source before attempting to remove or reinstall any component or assembly.
14. Never defeat any of the B+ voltage interlocks. Do not apply AC power to the unit (or any of its assemblies) unless all solid-state heat sinks are correctly installed.
15. Some semiconductor ("solid state") devices are easily damaged by static electricity. Such components are called Electrostatically Sensitive Devices (ESDs). Examples include integrated circuits and field-effect transistors. Immediately before handling any semiconductor components or assemblies, discharge the electrostatic charge from your body by touching a known earth ground.
16. Always connect a test instrument's ground lead to the instrument chassis ground before connecting the positive lead; always remove the instrument's ground lead last.
17. When checking the continuity of the switches or transformer, always make sure that the power is OFF, and one of the lead wires is disconnected.
18. Components that are critical for safety are indicated in the circuit diagram by shading, ⚠ or ⚡.
19. Use replacement components that have the same ratings, especially for flame resistance and dielectric strength specifications. A replacement part that does not have the same safety characteristics as the original might create shock, fire or other hazards.

NOTE : Connect the oven to a 20A circuit breaker. When connecting the oven to a 15A,make sure that circuit breaker can operate.

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1-2 Special High Voltage Precautions

1. High Voltage Warning Do not attempt to measure any of the high voltages --this includes the filament voltage of the magnetron. High voltage is present during any cook cycle. Before touching any components or wiring, always unplug the oven and discharge the high voltage capacitor (See Figure 1-1)
2. The high-voltage capacitor remains charged about 30 seconds after disconnection. Short the negative terminal of the high-voltage capacitor to to the oven chassis. (Use a screwdriver.)
3. High voltage is maintained within specified limits by close-tolerance, safety-related components and adjustments. If the high voltage exceeds the specified limits, check each of the special components.

PRECAUTION

There exists HIGH VOLTAGE ELECTRICITY with high current capabilities in the circuits of the HIGH VOLTAGE TRANSFORMER secondary and filament terminals. It is extremely dangerous to work on or near these circuits with the oven energized.

DO NOT measure the voltage in the high voltage circuit including filament voltage of magnetron.

PRECAUTION

Service technicians should remove their watches whenever working close to or replacing the magnetron.

PRECAUTION

Never touch any circuit wiring with your hand or with an uninsulated tool during operation.

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2. Specifications

2-1 Features

- Professional Design
Samsung New OTR with Stainless Steel, it has professional look and the design matches great with other kitchen appliances, so that it provides harmonious kitchen interior and finally completes total kitchen solution.

- Stirrer and Turntable
Continually rotates food to ensure even cooking.

- Instant Cook
Instant On Controls - Allow quick, one touch cooking and reheating.

- Venting System
- Four speed , 400CFM venting system
- Quickly removes smoke and steam from cook top

- One Touch Easy Filter
Samsung One Touch Filter system™ can be ejected and loaded by One Touch easily.
It is also positioned in front of OTR eye-level. Easy to check the condition of filter frequently without difficulty.
It can be cleaned easily with water and soap as one, because its a Washable filter that consists of only one piece for your convenience.

- Ceramic coating
The interior fully coated with Ceramic Enamel offers solid surface that never scratches and cracks.
So you can enjoy the same new interior even after long use. Moreover, it prevents bacteria and the smooth surface is easy to clean as well.
The significantly higher cooking temperature and animal protein can cause severe discoloration and cleaning issues. But the Ceramic Enamel Interior prevents all of them.

- LED Cook-top Lighting
LED lighting gently brightens every corner of your cook top.
Low Power consumption and long life of Samsung LED light saves a remarkable amount of energy.

- Big Interior Capacity
For convenience
With the 2.1 cu.ft capacity, it offers enough space to cook.

2-2 Table of Specifications

Items			BASIC MODEL	NEW MODEL	
			SMH2117S/XAA SMH2117S/XAC	ME21H706MQ*/AA ME21H706MQ*/AC	
General	Capacity		2.1 cu.ft	2.1 cu.ft	
	Power	Power Source	120V~60Hz	120V~60Hz	
		Output Power (Microwave)	SMH2117S/XAA 1,000W	ME21H706MQ*/AA	1,000W
			SMH2117S/XAC 950W	ME21H706MQ*/AC	950W
		Power Consumption	SMH2117S/XAA 1,700W	ME21H706MQ*/AA	1,700W
			SMH2117S/XAC 1,500W	ME21H706MQ*/AC	1,500W
	Output Power		100W/1100W (IEC-705)	100W/1000W (IEC-705)	
	Operation frequescy		2450MHz	2450MHz	
	Cooling Method		Cooling fan Motor	Cooling fan Motor	
	Sensor		GAS	SMART MULTI SENSOR (IR)	
	Display		ICE BLUE	ICE BLUE	
	Contorl Method		MEMBRANE	MEMBRANE	
	Door Open Mechanism		SIDE SWING	SIDE SWING	
	MW Distribution Mechanism		SIDE FEEDING	SIDE FEEDING	

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Table of Specifications (Cont.)

Items			BASIC MODEL SMH2117S/XAA SMH2117S/XAC	NEW MODEL ME21K6000AS/AA
Feature	Sensor Cook Mode	1. Popcorn	YES	YES
		2. Potato	YES	YES
		3. Pizza	YES	YES
		4. Cook	YES	YES
		5. Reheat	YES	YES
		6. Veggies	YES	YES
	Auto Cook Mode	1. Kids Meals	YES	YES
		2. Snacks	YES	YES
		3. Soften Melt	YES(3)	YES(4)
		4. 1 Pound Defrost	YES	YES
		5. Auto Defrost	YES	NO
		6. Custom Cook	YES	NO
		7. Fit Choice	NO	YES
		8. Smart Defrost	NO	YES
		9. Favorite Cook	NO	YES
	Clock		YES	YES
	Timer		YES	YES
	Max time Cooking	MW	99 min 99 sec	99 min 99 sec
	Power Level		YES(10 Level)	YES(10 Level)
	Setting	Sound Option	YES	YES
		Clock System Option (24H/12H/24H+12H)	12H	24H + 12H
		Child Lock	YES	YES
		Turntable On/Off	NO	YES
Material & Finishes	Door Color		STSS	Black
	Cavity Interior		Ceramic Enamel	Ceramic Enamel
	Packing Case		Yellow Box	Yellow Box
Accessory	Wire Rack		YES (Rectangular Rack)	YES (Rectangular Rack)
Physical Specification	OUTSIDE DIMENSIONS		29 7/8"(W) x 16 1/2"(H) x 18 1/2"(D)	29 7/8"(W) x 16 15/16"(H) x 18 5/32"(D)
	OVEN CAVITY DIMENSIONS		22 1/8"(W) x 10 13/16"(H) x 14 13/16"(D)	22 1/8"(W) x 10 13/16"(H) x 14 27/32"(D)
	SHIPPING DIMENSIONS		33 3/8"(W) x 19 7/16"(H) x 20 13/16"(D)	33 3/8"(W) x 20 3/4"(H) x 19 13/32"(D)
	NET WEIGHT		55.9 lbs	Color : 58 lbs (26.3 kg) STS : 59.2 lbs (26.9 kg)
	SHIPPING WEIGHT		64.2 lbs	Color : 64.7 lbs (29.4 kg) STS : 65.9 lbs (29.9 kg)
Export Zone			USA CANADA	USA

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2. Specifications

2-3 Accessory

Item	Description	Code No.		Q'ty
		ME21H706MQ*/AA	ME21H706MQ*/AC	
	Glass tray	DE74-20002D		1
	Roller guide ring	DE92-90189V		1
	Top Template	DE68-03843A	DE68-03843B	1
	Wall template	DE68-03142B	DE68-02230Q	1
	Installation instructions	DE68-04108A	DE68-04108B	1
	Use and Care Guide	DE68-03970A	DE68-03970C	1
	Manual Guide	DE68-04291A	DE68-04291A DE68-04291B	1
	Hardware-kit	DE92-90505N		1
	FILTER AIR (INSTALLED)	DE63-00196A		1
	Charcoal filter	DE63-30016D		1
	Shelf	DE75-00083A		1
	Exhaust adaptor	DE92-90242D		1

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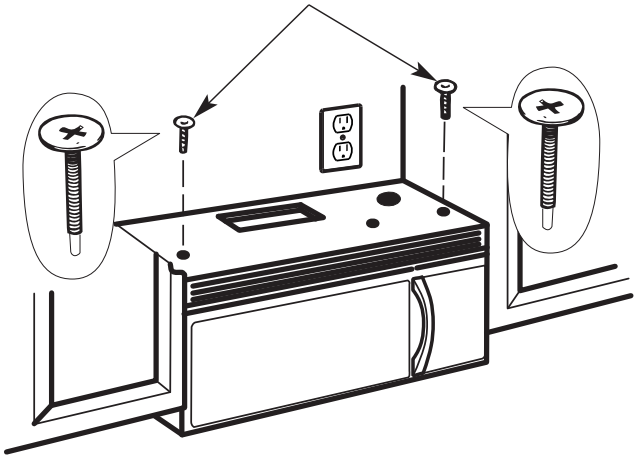
3. Disassembly and Reassembly

MAGNETRON, MOTOR ASSEMBLY, VENT BLOWER AND HIGH VOLTAGE TRANSFORMER

Oven must be removed from wall.

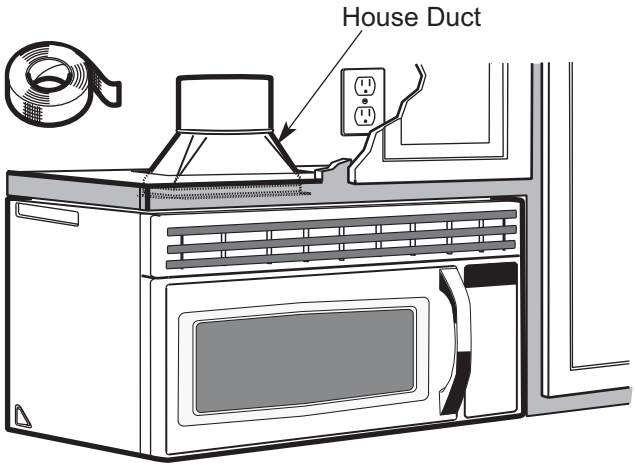
REMOVING OVEN FROM WALL (2 PEOPLE REQUIRED)



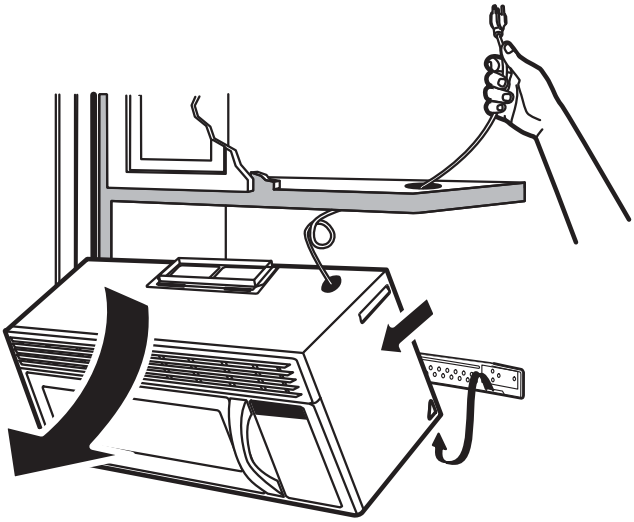
Disconnect the power cord from the outlet.

The oven is hooked on the metal tabs of the wall mounting plate that is secured to the wall. It is not necessary to remove this mounting plate to service this unit.

This unit is attached to the cabinet above by two self aligning screws. Support the unit while removing these screws allowing it to hinge downward to disengage the unit from the mounting plate.



Be aware there may also be a connection to the range vent ductwork that is attached to the top or back of the unit through an exhaust adapter/damper.



Remove the oven from the wall

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3. Disassembly and Reassembly

3-1 Replacement of High Voltage Transformer

Parts	Explanation Photo	Explanation
Grille		**1.** Disconnect oven power. **2.** Remove Grille. **1)** Remove 2 screws **2)** Slide the Grille to the left, then pull it straight out.
Panel Outer		**3.** Remove the 16 screws from the Panel Outer and remove Panel Outer by pulling it to the rear of the set.

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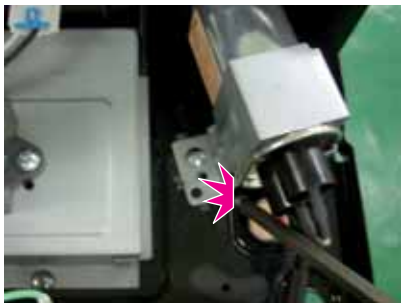
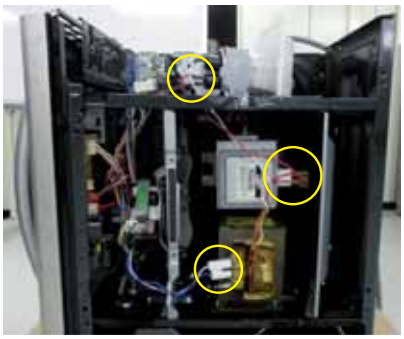
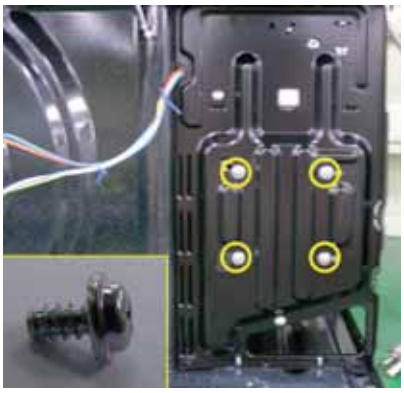
3. Disassembly and Reassembly

3-1 Replacement of High Voltage Transformer

Parts	Explanation Photo	Explanation
High voltage capacitor		**4.** Discharge the High voltage capacitor.
		**5.** Disconnect all the leads.
Base Bottom		**6.** Remove 7 screws from the Base bottom. Disconnect the wire connectors. Remove Base bottom.
HV Trans		**7.** Remove the 4 screws from the HV Transformer and take out the HV Trans.

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3-2 Replacement of Magnetron

Parts	Explanation Photo	Explanation
Magnetron		Remove the magnetron including the shield case, permanent magnet, choke coils and capacitors (all of which are contained in one assembly). **1.** Disconnect all lead wires from the magnetron.
		2. Remove nuts (2) securing the magnetron to the wave guide. **3.** Take out the magnetron very carefully.

NOTE1: When removing the magnetron, make sure that the antenna does not hit any adjacent parts, or it may be damaged.

NOTE2: When replacing the magnetron, be sure to remount the magnetron gasket in the correct position and make sure the gasket is in good condition.

NOTE3: Reconnect the lead wire to thermal cutout mounted on the magnetron, before replacing the magnetron.

⚠ PRECAUTION

During replacement, be certain the R.F. anode gasket is in place around the anode stub.

PERFORM MICROWAVE LEAKAGE TEST

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3-3 Replacement of Fan Motor

Parts	Explanation Photo	Explanation
Fan Motor		**1.** Remove Grille and Panel Outer. **2.** Disconnect all lead wires from Fan Motor and High Voltage Transformer.
		3. Remove 2 screws from the Assy Fan Motor and pull out Assy Fan Motor.
		4. Remove Fan Blade. **5.** Remove screws (2) securing Fan Motor. **6.** Replace Fan Motor to new one.
		7. After replacing Fan Motor and reconnecting lead wires, make sure that the connectors are connected securely on the terminal of Fan Motor by pulling the wires lightly.

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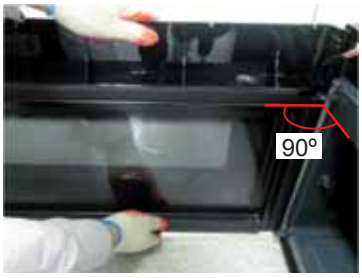
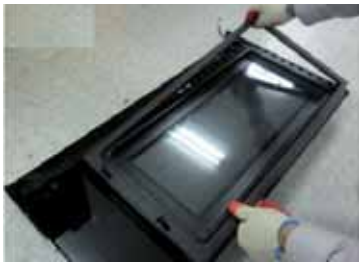
3-4 Replacement of Door Assembly

Parts	Disassembly Photo	Explanation
Removal of Door Assembly	 	1. Disconnect the lead wire. 2. Remove Door pin. 3. Open the Assembly Door by degree 90º 4. Seperate lifting Assembly Door from Set.
Removal of Door C	 	5. Insert flat screwdriver into the gap between Door "A" and Door "C" to remove Door "C". • Becareful when handling Door "C" because it is fragile.
Removal of Key Door & Spring		6. Detach the spring and key door from Door.

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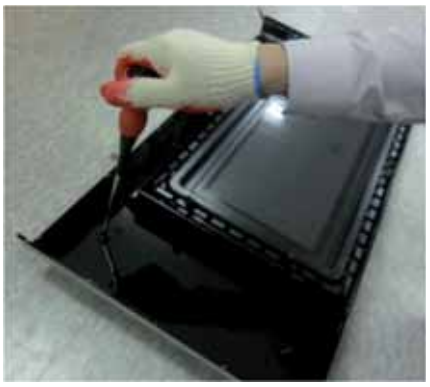
3-4 Replacement of Door Assembly

Parts	Disassembly Photo	Explanation
Removal of Handle		**7.** Remove 2 screws, then handle is detached from Door "A".
Removal of Door "E"		**8.** Remove 4 screw securing Door "E" to Door "A". **9.** Following the procedure as shown in the figure, insert and bend a thin metal plate between Door "E" and Door "A" until you hear the 'tick' sound. • Insertion depth of the thin metal plate should be 0.5mm or less.

PRECAUTION

PERFORM MICROWAVE LEAKAGE TEST

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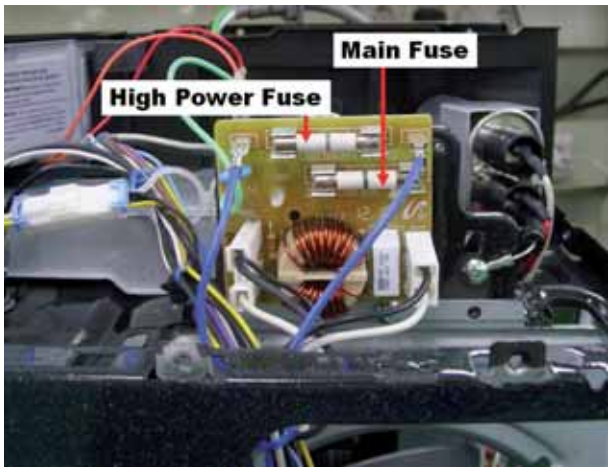
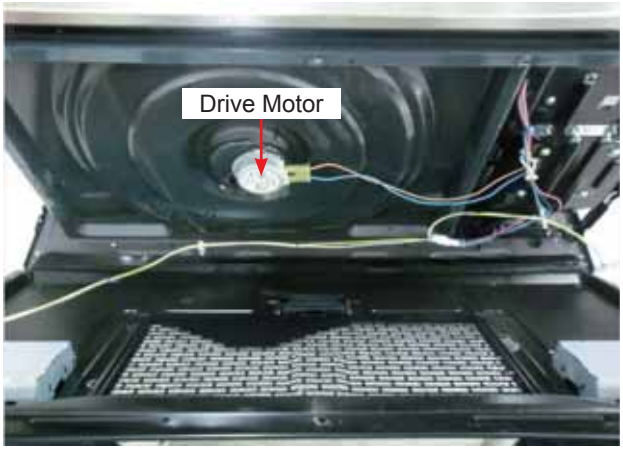
3-5 Replacement of Fuse

Parts	Explanation Photo	Explanation
Fuse		The fuse is located on the noise filter. **1.** Disconnect power and remove grille. **2.** Replace the fuse. **3.** When 20A fuse blows out by the operation of interlock monitor switch failure, replace the primary interlock switch, secondary interlock switch, door sensing switch, interlock monitor switch and power relay. **4.** When the above four switches operate properly, check if any other part such as the control circuit board, blower motor or high voltage transformer is defective.

3-6 Replacement of Drive Motor

Parts	Explanation Photo	Explanation
Drive Motor		**1.** Disconnect power and remove bottom plate screws(5). **2.** Remove bottom plate and disconnect the turntable motor drive. **3.** Remove turntable motor screws(1) and pull the turntable motor out. **4.** When replacing the drive motor, be sure to remount it in the correct position with the coupler. **5.** Connect all the leads to the drive motor.

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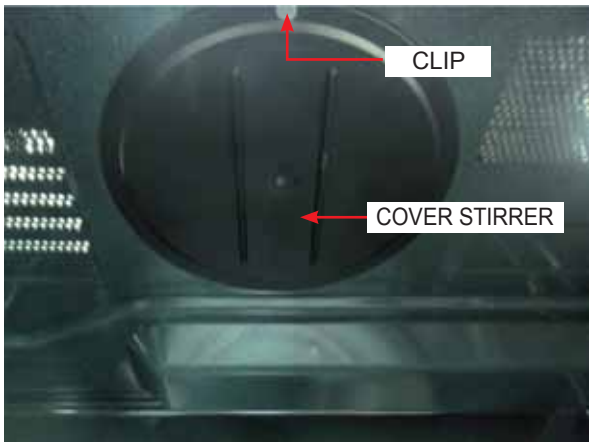
3-7 Removal of Stirrer

Parts	Explanation Photo	Explanation
Stirrer	 	The stirrer is located on the upper side of the cavity. The oven uses a side feed wave guide. **1.** Disconnect power and open the door. **2.** Remove the clip and turn the stirrer cover left. **3.** Remove stirrer cover and the stirrer will come with it.

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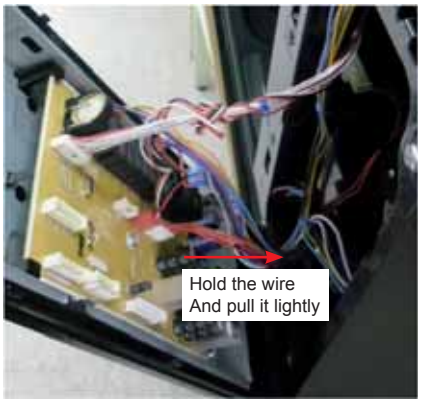
3-8 Replacement of Control Circuit Board (MAIN PBA)

3-8-1 MAIN PBA

Parts	Explanation Photo	Explanation
Removal of Control Box Assembly		**1.** Disconnect power and remove grille. **2.** Be sure to ground any static electric charge in your body and never touch the control circuit. **3.** Remove a screw securing the control box assembly. **4.** Disconnect the connectors from the control circuit board.
Removal of P.C.B Assembly		**1.** Remove screws securing the control circuit board. **2.** Lift up the control circuit board from the Ass'y control box. **3.** After reconnecting the connectors, make sure that the connectors are connected securely on the terminal of control circuit board by pulling the wires lightly.

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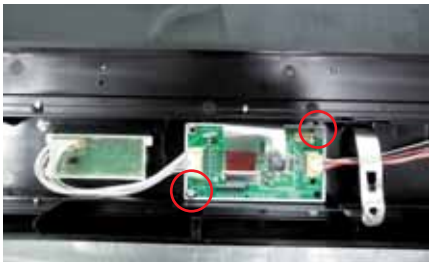
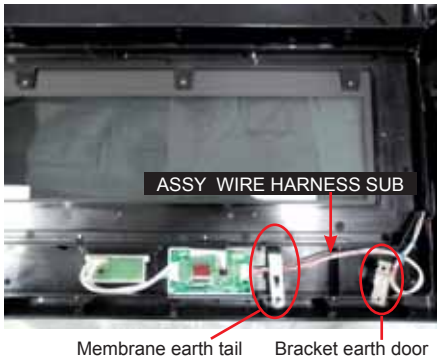
3-8 Replacement of Control Circuit Board

3-8-2 SUB Module

Parts	Explanation Photo	Explanation
Removal of P.C.B Assembly (SUB Module)	 	1. Remove the Door-E (14Page) 2. Pull the lever end of the plastic fastener and remove the Flexible Printed Circuit(FPC) of Membrane. 3. Remove screws (2) securing the control circuit board. 4. Lift up the control circuit board from the Ass`y door-A. 5. When reconnecting the FPC connector, make sure that the holes on the connector are properly engaged with the hooks on the Plastic Fastener. • When need to change ASSY WIRE HARNESS SUB, remove the membrane earth tail from hook and disconnect wire from the control circuit board. • When reconnecting the ASSY WIRE HARNESS SUB, make sure that the membrane earth tail should be hung on the hook.

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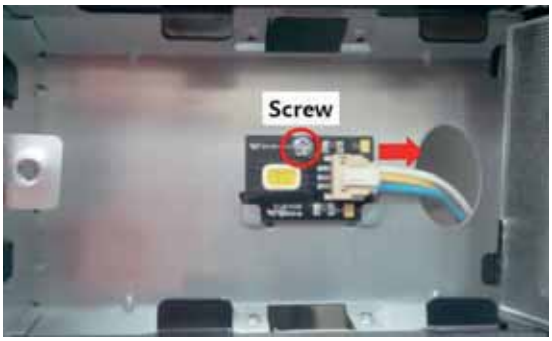
3-9 Replacement of Cooktop lamp

When replacing the night light, make sure that you are wearing gloves to avoid injury from the heat of the bulb.

Parts	Explanation Photo	Explanation
Cooktop Lamp	 	**1.** Unplug the oven or turn off the power at the main power. **2.** Remove the lamp cover, and mounting screws. **3.** Replace LED lamp board. **4.** Replace the lamp cover and mounting screws. **5.** Turn the power back on at the main power supply.

NOTE1: To purchase a new LED lamp board, visit an authorized service center or call 1-800-Samsung (1-800-726-7864).

NOTE2: The current of Normal LED lamp is 85mA ~ 150mA (in DC12V).

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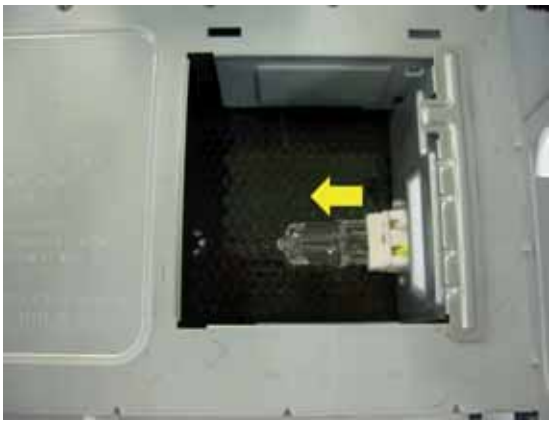
3-10 Replacement of Oven Light

Parts	Explanation Photo	Explanation
Oven Light	 	**1.** Remove the Grille **2.** Remove the COVER LAMP by removing the screw and put up the lever. **3.** Replace the bulb with a 50 watt halogen bulb.

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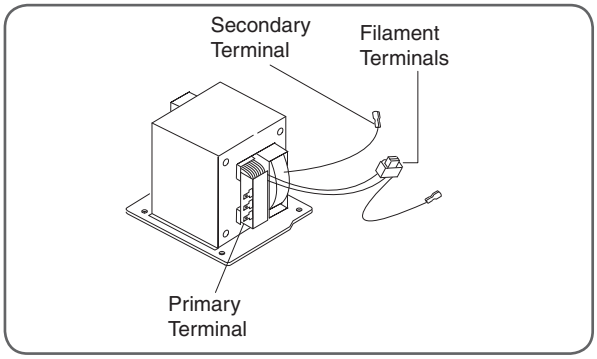
4. Alignment and Adjustments

PRECAUTION

1. High voltage is present at the high voltage terminals during any cook cycle.
2. It is neither necessary nor advisable to attempt measurement of the high voltage.
3. Before touching any oven components or wiring, always unplug the oven from its power source and discharge the high voltage capacitor.

4-1 High Voltage Transformer

1. Remove connectors from the transformer terminals and check continuity.
2. Normal resistance readings are as follows:



<ME21H706MQ*/AA>

	SHV-U1870D
Secondary	Approx. 125.0 Ω + 2%
Filament	Shows Continuity
Primary	Approx. 0.390 Ω + 2% (High) Approx. 0.430 Ω + 2% (Low)

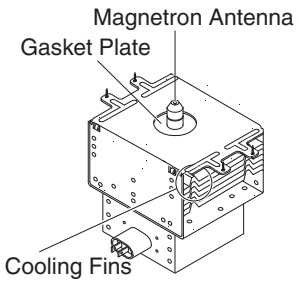
<ME21H706MQ*/AC>

	SHV-U1850A
Secondary	Approx. 131.0 Ω ± 2%
Filament	Shows Continuity
Primary	Approx. 0.440 Ω ± 2% (High) Approx. 0.480 Ω ± 2% (Low)

(Room temperature = 20°C)

4-2 Magnetron

1. Continuity checks can indicate only an open filament or a shorted magnetron. To diagnose an open filament or shorted magnetron.
2. Isolate the magnetron from the circuit by disconnecting its leads.
3. A continuity check across the magnetron filament terminals should indicate one ohm or less.
4. A continuity check between each filament terminal and magnetron case should read open.



4-3 High Voltage Capacitor

1. Check continuity of the capacitor with the meter set at the highest resistance scale.
2. Once the capacitor is charged, a normal capacitor shows continuity for a short time, and then indicates 9MΩ.
3. A shorted capacitor will show continuous continuity.
4. An open capacitor will show constant 9MΩ.
5. Resistance between each terminal and chassis should read infinite.

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4-4 High Voltage Diode

1. Isolate the diode from the circuit by disconnecting its leads.
2. With the ohm-meter set at the highest resistance scale, measure across the diode terminals. Reverse the meter leads and read the resistance. A meter with 6V, 9V or higher voltage batteries should be used to check the front-to back resistance of the diode (otherwise an infinite resistance may be read in both directions). The resistance of a normal diode will be infinite in one direction and several hundred KΩ in the other direction.

4-5 Main Relay and Power Control Relay

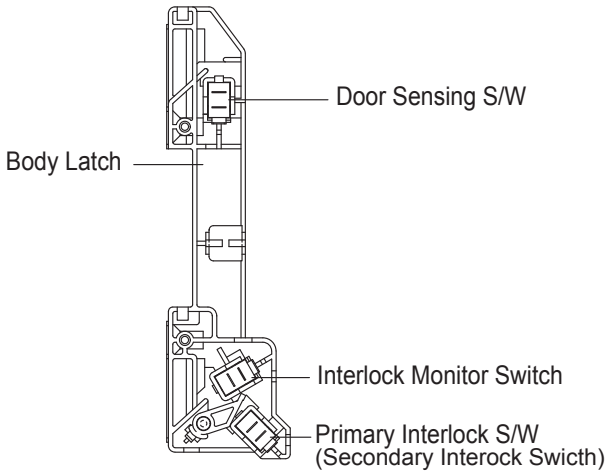
1. The relays are located on the PCB Ass'y. Isolate them from the main circuit by disconnecting the leads.
2. Operate the microwave oven with a water load in the oven. Set the power level set to high.
3. Check continuity between terminals of the relays after the start pad is pressed.

4-6 Adjustment of Primary Switch, Door Sensing Switch and Monitor Switch

PRECAUTION

For continued protection against radiation hazard, replace parts in accordance with the wiring diagram and be sure to use the correct part number for the following switches: Primary and secondary interlock switches, and the interlock monitor switch (replace all together). Then follow the adjustment procedures below. After repair and adjustment, be sure to check the continuity of all interlock switches and the interlock monitor switch.

1. When mounting Primary switch and Interlock Monitor switch to Latch Body, consult the figure.
2. No specific adjustment during installation of Primary switch and Monitor switch to the latch body is necessary.
3. When mounting the Latch Body to the oven assembly, adjust the Latch Body by moving it so that the oven door will not have any play in it. Check for play in the door by pulling the door assembly. Make sure that the latch keys move smoothly after adjustment is completed. Completely tighten the screws holding the Latch Body to the oven assembly.
4. Reconnect to Monitor switch and check the continuity of the monitor circuit and all latch switches again by following the components test procedures.
5. Confirm that the gap between the switch housing and the switch actuator is no more than 0.5mm when door is closed.
6. Interlock Switch Replacement - When replacing faulty switches, be sure switch mounting tabs are not bent, broken or otherwise deficient in their ability to secure the switches in place.



	Door Open	Door Closed
Primary Interlock switch	∞	0
Monitor switch(COM-NC)	0	∞
Monitor switch(COM-NO)	∞	0
Door Sensing S/W (Secondary Interlock S/W)	∞	0

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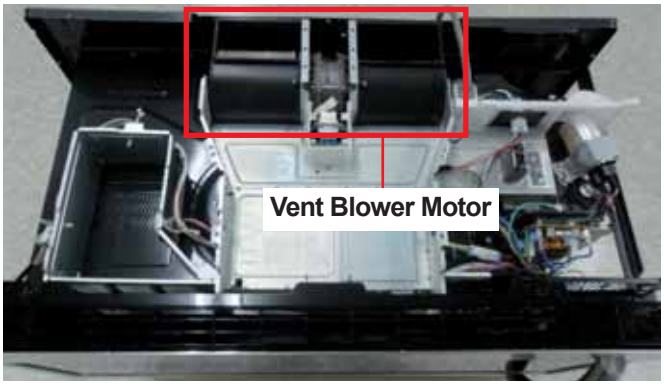
4-7 Vent Exhaust Blower Motor

THIS COMPONENT REQUIRES REMOVAL OF MICROWAVE OVEN FROM INSTALLATION FOR SERVICING.



RUN CAPACITOR

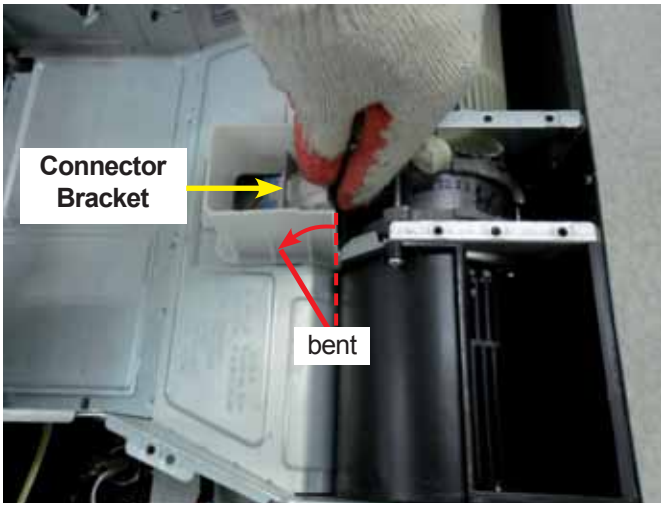
The run capacitor is located behind the top grill above the control area. The capacitor is used for more torque and electrical phasing. Without the capacitor the blower might run but would be much slower.

TO TEST THE CAPACITOR

1. Remove grill, discharge capacitor and disconnect one capacitor lead.
2. Make appropriate capacitor check (with analog meter needle should rise then fall, cap is charging then discharging).

TO TEST BLOWER WINDINGS:

1. Disconnect power and remove grill.
2. Open control panel and discharge capacitor.
3. Disconnent two wires to run capacitor. Continuity test across the two wires should be approximately 50 ohms of resistance. This test allows you to read across all three windings at the same time.



TO REMOVE VENT BLOWER

1. Remove unit from its installation.
2. Remove 3 screws securing motor to top and back of unit and lift off. (1 screw is located under damper.)
3. Disconnect blower plug.

NOTE: Place blower wires in routing slots to avoid pinching of wires.

NOTE: It's normal that connector bracket bends when reconnecting Hood Blower Motor connector.

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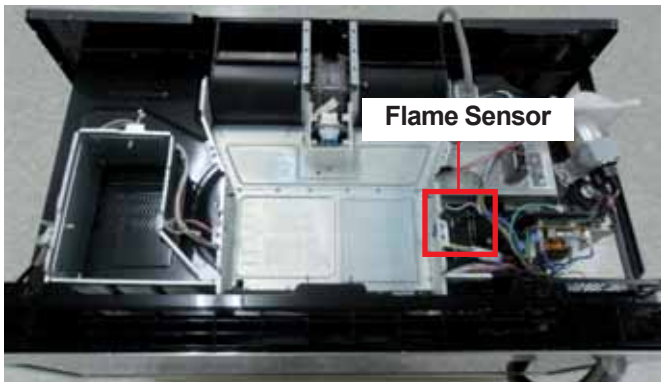
4-8 Thermal Cutout (TCO'S)

There are 4 different thermal cutouts in this unit with 4 different purposes. They are :

1. Oven thermal cutout (flame sensor), on cavity top.
2. Hood thermal cutout, inside control area on duct.
3. Bottom thermal cutout, on floor of control area.
4. Magnetron thermal cutout, on magnetron.

4-8-1 Oven Thermal Cutout(Flame sensor)

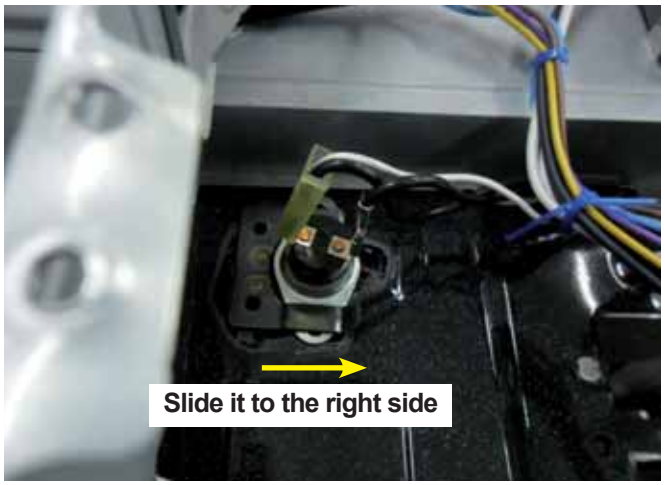
The oven thermal cutout(Cavity TCO) is located on the top side of the oven cavity beside exhaust duct with a temperature rating of 248°F(120°C) and is non-resetable. The cutout is tightly held to the top of the oven cavity under the duct-upper.



4-8-2 Replacement of Flame Sensor

Disconnect oven power. Remove Grill & Panel-outer.

1. Disconnect two wire leads.
2. Slide the top of the thermal cutout and pull out it



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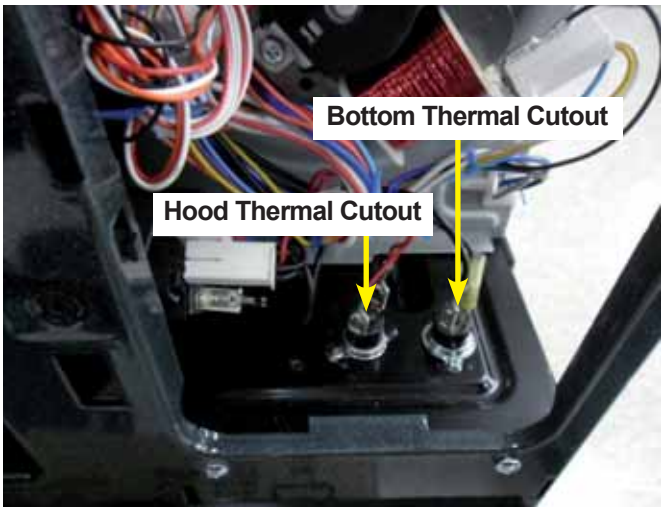
4-8-3 Hood Thermal Cutout

This cutout will protect the touch control from excessive heat by turning the vent fan on at low speed. If the surface units of the range are used for long periods of time heat will build up and could damage the microwave control. In order to prevent this a thermal cutout is installed on the duct behind the control. This cutout will close (158°F/70°C - vent fan energized)and open (104°F/40°C - vent fan de-energized) depending on temperatures it senses.



To Remove hood Thermal Cutout :

1. Disconnect power and remove grill.
2. Remove control box assembly.
3. Remove two wire leads and unscrew one screw securing the cutout on the duct.

NOTE : If this cutout were to open it would be difficult to detect. The only time it functions is during an overheat condition. It will be normally open when checked with an ohmmeter.

4-8-4 Bottom Thermal Cutout

This part can be serviced without removing the microwave from installation.

During a fire on the stove the heat could be intense enough to close the Hood Thermal Cutout and force the fan to run. While at moderate high temperature we do want it to run, during a fire it is advantageous to NOT have the vent fan running. So if a fire were to start on the stove top the Bottom Thermal Cutout would open at 248°F(120°C) and remove all power to the microwave oven.

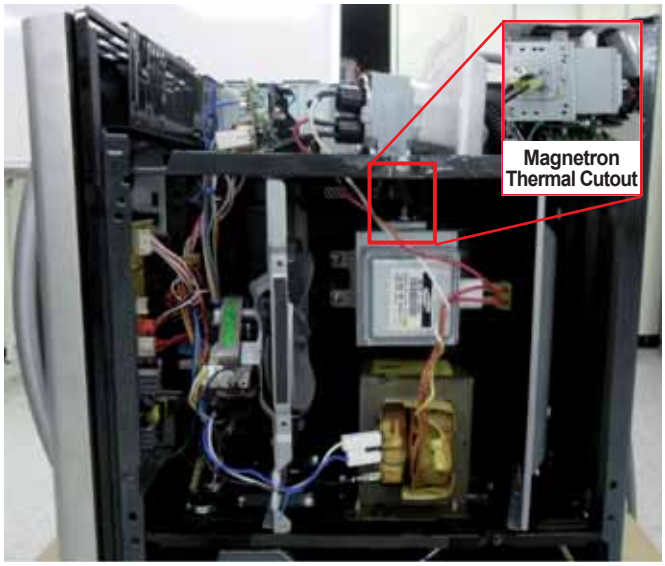
This cutout is designed to not be resetable.

To Remove Magnetron Thermal Cutout :

1. Disconnect power and remove grill.
2. Remove control box assembly.
3. Remove two wire leads and unscrew one screw securing the cutout on the base plate.

4-8-5 Magnetron Thermal Cutout

The magnetron thermal cutout is located above the leads to the magnetron. It is designed to prevent damage to the magnetron if an overheated condition develops in the tube due to a cooling fan failure, obstructed air ducts, or a dirty or blocked air intake. Under normal operation, the magnetron thermal cutout remains closed. However, when abnormally high temperatures are reached within the magnetron, the magnetron thermal cutout will open at 302°F(150°C) causing the oven to shut down. After the temperature drops to 140° F(60°C) it will reset and cooking will be able to resume.



To Remove Magnetron Thermal Cutout :

1. See 'Removing Magnetron'.

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4-9 Output Power of Magnetron

PRECAUTION

MICROWAVE RADIATION

PERSONNEL SHOULD NOT ALLOW EXPOSURE TO MICROWAVE RADIATION FROM MICROWAVE GENERATOR OR OTHER PARTS CONDUCTING MICROWAVE ENERGY.

The output power of the magnetron can be measured by performing a water temperature rise test.

Equipment needed :

- Two 1-liter cylindrical borosilicate glass vessel (Outside diameter 190 mm)
- One glass thermometer with mercury column

NOTE: Check line voltage under load. Low voltage will lower the magnetron output. Make all temperature and time tests with accurate equipment.

1. Fill the one liter glass vessel with water.
2. Stir water in glass vessel with thermometer, and record glass vessel's temperature ("T1", 10±1°C).
3. After moving the water into another glass vessel, place it in the center of the cooking tray. Set the oven to high power and operate for 45 seconds exactly. (3 seconds included as a holding time of magnetron oscillation:)
4. When heating is finished, stir the water again with the thermometer and measure the temperature ("T2").
5. Subtract T1 from T2. This will give you the water temperature rise. (ΔT)
6. The output power is obtained by the following formula;

$$\text{Output Power} = \frac{4.187 \times 1000 \times \Delta T + 0.55 \times Mc \times (T2 - T1)}{42}$$

45 :	Heating Time
42	: Counting Time (sec)
4.187	: Coefficient for Water
1000	: Water (cc)
ΔT	: Temperature Rise (T2-T1)
To :	Room Temperature
Mc	: Cylindrical borosilicate glass weight

7. Normal temperature rise for this model is 9°C to 11°C at 'HIGH'.

NOTE 1: Variations or errors in the test procedure will cause a variance in the temperature rise. Additional power test should be made if temperature rise is marginal.

NOTE 2: Output power in watts is computed by multiplying the temperature rise (step 5) by a factor of 91 times the of centigrade temperature.

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4-10 Procedure for Measurement of Microwave Energy Leakage

1. Pour 275±15cc of 20±5°C(68±9°F) water in a beaker which is graduated to 600cc, and place the beaker in the center of the oven.
2. Start to operate the oven and measure the leakage by using a microwave energy survey meter.
3. Set survey meter with dual ranges to 2,450MHz.
4. When measuring the leakage, always use the 2 inch spacer cone with the probe. Hold the probe perpendicular to the cabinet door. Place the spacer cone of the probe on the door and/or cabinet door seam and move along the seam, the door viewing window and the exhaust openings moving the probe in a clockwise direction at a rate of 1 inch/sec. If the leakage testing of the cabinet door seam is taken near a corner of the door, keep the probe perpendicular to the areas making sure that the probe end at the base of the cone does not get closer than 5cm to any metal. If it gets closer than 5cm, erroneous readings may result.
5. Measured leakage must be less than 4mW/cm^2 , after repair or adjustment.

Maximum allowable leakage is 5mW/cm^2 .
4mW/cm^2 is used to allow for measurement and meter accuracy

4-11 Check for Microwave Leakage

1. Remove the outer panel.
2. Pour 275±15cc of 20±5°C(68±9°F) water in a beaker which is graduated to 600cc, and place the beaker in the center of the oven.
3. Start the oven at the highest power level.
4. Set survey meter dual ranges to 2,450MHz.
5. Using the survey meter and spacer cone as described above, measure near the opening of magnetron, the surface of the air guide and the surface of the wave guide as shown in the following photo.
   (but avoid the high voltage components.)
   The reading should be less than 4mW/cm^2.

4-12 Note in Measurement

1. Do not exceed the limited scale.
2. The test probe must be held on the grip of the handle, otherwise a false reading may result when the operator's hand is between the handle and the probe.
3. When high leakage is suspected, do not move the probe horizontally along the oven surface; this may cause damage to the probe.
4. Follow the recommendation of the manufacturer of the microwave energy survey meter.

4-13 Leakage Measuring Procedure

4-13-1 Record keeping and notification after measurement

1) After adjustment and repair of a radiation preventing device, make a repair record for the measured values, and keep the data.

4-13-2 At least once a year have the microwave energy survey meter checked for accuracy by its manufacturer.

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4-14 SMART MULTI SENSOR

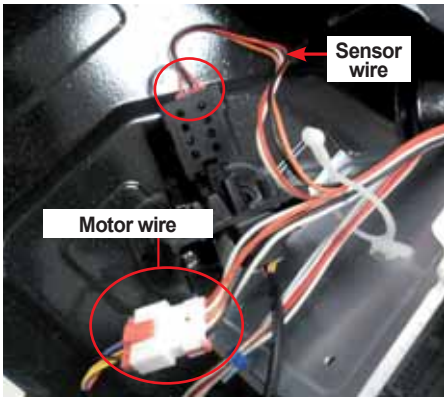
The Sensor Cooking Function uses a special Smart Multi Sensor which detects temperature of the food during cooking process.

To Service :

1. Disconnect power and remove Panel-outer.
2. Remove screw (1) securing the holder cover.
3. Disconnect two lead wires from the DC motor and sensor PCB.
4. Remove screw (1) securing the sensor.

SENSOR TEST (QUICK TEST)

1. With 2 fingers touch and hold the following pads at the same time :
   Smart Defrost and **Popcorn**
2. Observe diagnostic number on the display during pressing two buttons. If the sensor has any problem, E-83 communication error will be displayed.



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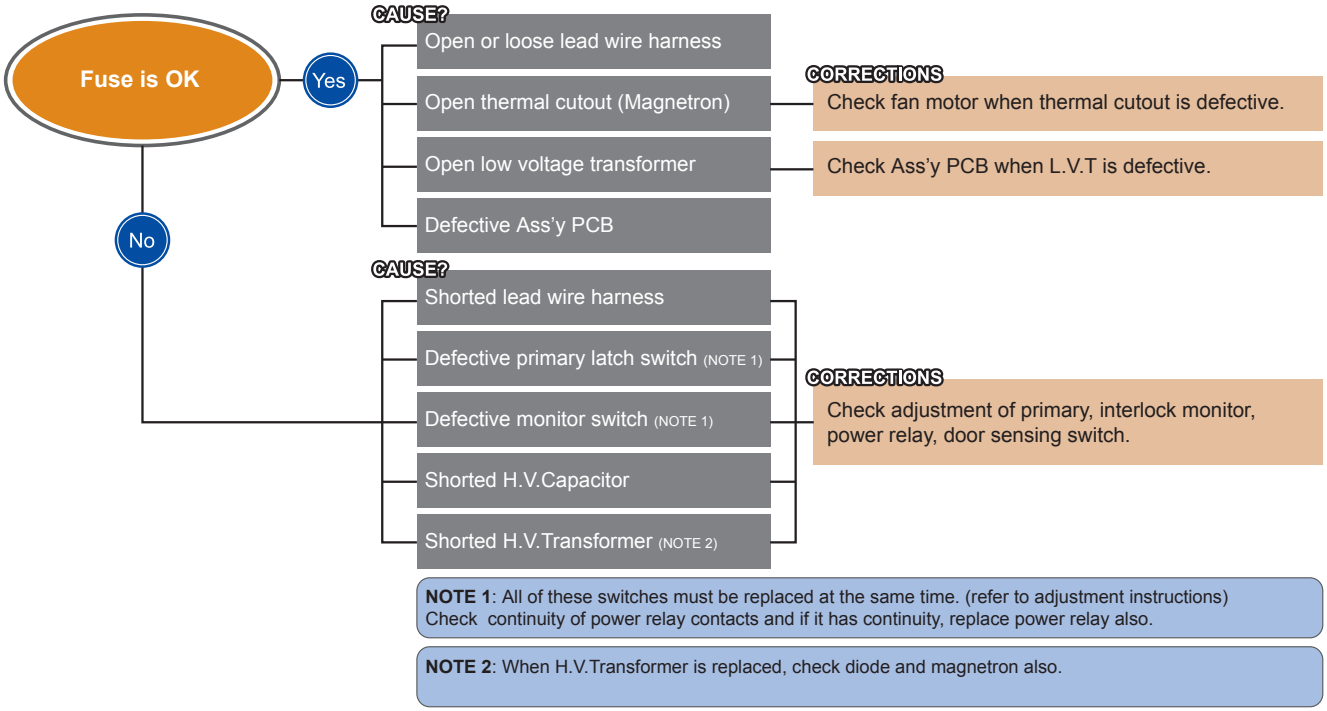
5. Troubleshooting

PRECAUTION

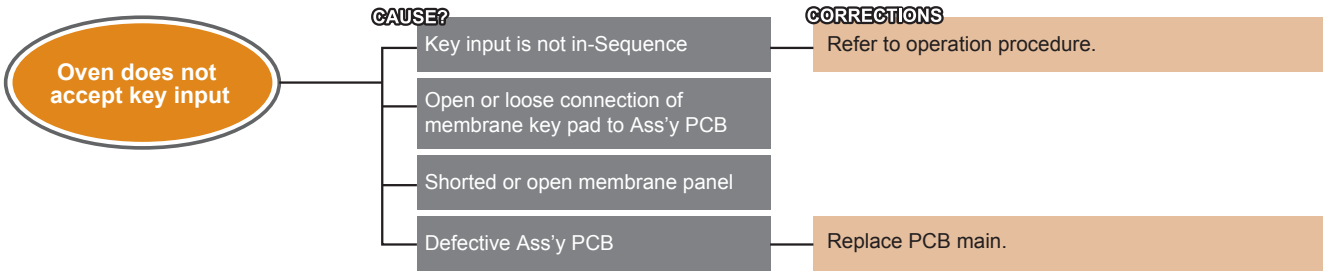
1. CHECK GROUNDING BEFORE CHECKING FOR TROUBLE.
2. BE CAREFUL OF THE HIGH VOLTAGE CIRCUIT.
3. DISCHARGE THE HIGH VOLTAGE CAPACITOR.
4. WHEN CHECKING THE CONTINUITY OF THE SWITCHES OR TRANSFORMER, DISCONNECT ONE LEAD WIRE FROM THESE PARTS AND THEN CHECK CONTINUITY WITHOUT THE POWER SOURCE ON. TO DO OTHERWISE MAY RESULT IN A FALSE READING OR DAMAGE TO YOUR METER.
5. DO NOT TOUCH ANY PART OF THE CIRCUIT OR THE CONTROL CIRCUIT BOARD, SINCE STATIC DISCHARGE MAY DAMAGE IT. ALWAYS TOUCH GROUND WHILE WORKING ON IT TO DISCHARGE ANY STATIC CHARGE BUILT UP.

5-1 Electrical Malfunction

Oven is dead. (No display and no operation at all.)



Oven does not accept key input (Program)



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5. Troubleshooting

Timer starts countdown but no microwave oscillation.

(No heat while oven lamp and fan motor turn on.)

Timer starts countdown but no microwave oscillation

CAUSE?	CORRECTIONS
Off-alignment of latch switches	Adjust door and latch switches.
Open or loose connection of high voltage circuit especially magnetron filament circuit (NOTE)	Check high voltage component according to component test procedure and replace if it is defective.
Defective high voltage components H.V.Transformer H.V. Capacitor H.V.Diode, H.V.Fuse Magnetron	
Open or loose wiring of power relay	
Defective primary latch switch	
Defective power relay or Ass'y PCB	Replace PCB main.

NOTE: Large contact resistance will bring lower magnetron filament voltage and cause magnetron to lower output and/or intermittent oscillation.

Oven can program but timer does not start.(A message of "Close Door" appears on the display.)

Oven can program but timer does not start (A message of "Close Door" appears on the display.)

CAUSE?	CORRECTIONS
Open or loose wiring of secondary interlock switch	Adjust door and interlock switches.
Off-alignment of primary interlock	
Defective secondary interlock S/W	

Microwave output is low. (Oven takes longer time to cook food.)

Microwave output is low

CAUSE?	CORRECTIONS
Decrease in power source voltage	Consult electrician.
Open or loose wiring of magnetron filament circuit. (Intermittent oscillation)	
Aging of magnetron	

Fan motor turns on when plugged in.

Fan motor turns on when plugged in

CAUSE?	CORRECTIONS
Loose wiring of door sensing switch	Tighten door sensing switch wiring.

Oven does not operate and return to the plugged in mode.

Oven does not operate and return to the plugged in mode

CAUSE?	CORRECTIONS
Defective Ass'y PCB	Replace PCB main.

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5. Troubleshooting

Loud buzzing noise can be heard.

	CAUSE?	CORRECTIONS
Loud buzzing noise can be heard	Loose fan and fan motor	Tighten screws of fan motor.
	Loose screws on H.V.Transformer	Tighten screws of H.V.Transformer.
	Shorted H.V.Diode	Replace H.V.Diode.

Turntable motor does not rotate.

	CAUSE?	CORRECTIONS
Turntable motor does not rotate.	Open or loose wiring of turntable motor.	Replace turntable motor.
	Defective turntable motor	

Oven stops operation during cooking.

	CAUSE?	CORRECTIONS
Oven stops operation during cooking	Open or loose wiring of primary interlock switch	Adjust door and latch switches.
	Operation of thermal cutout (Magnetron)	

Sparks.

	CAUSE?	CORRECTIONS
Sparks	Metallic ware or cooking dishes touching on the oven wall	**Inform the customer**: Do not use any type of cookware with metallic trimming
	Ceramic ware trimmed with gold or silver powder also causes sparks	

Uneven cooking.

	CAUSE?	CORRECTIONS
Uneven cooking	Uneven intensity of microwave due to its characteristics	Aluminum foil should not be placed in the oven.
		Use plastic wrap or cover with a lid.
		Stir once or twice while cooking foods such as soup, cocoa, or milk.

Noise from the turntable motor when it starts to operate.

	CAUSE?	CORRECTIONS
Noise from the turntable motor when it starts to operate.	Noise may result from the motor	Replace turntable motor.

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5-2 Error Code List

Error Code	Others (E-0X, Letter)	Solution
-SE-	Key short Error (10 seconds) If KEY input is successive more than 10 seconds, marks -SE-.	Press the Stop/Clear button. If the button isn`t pressed, replace the switch membrane panel.
E-83	Communication Error between Main PCB and Sub PCB.	Replace Communication Wire or Replace Control Circuit Board

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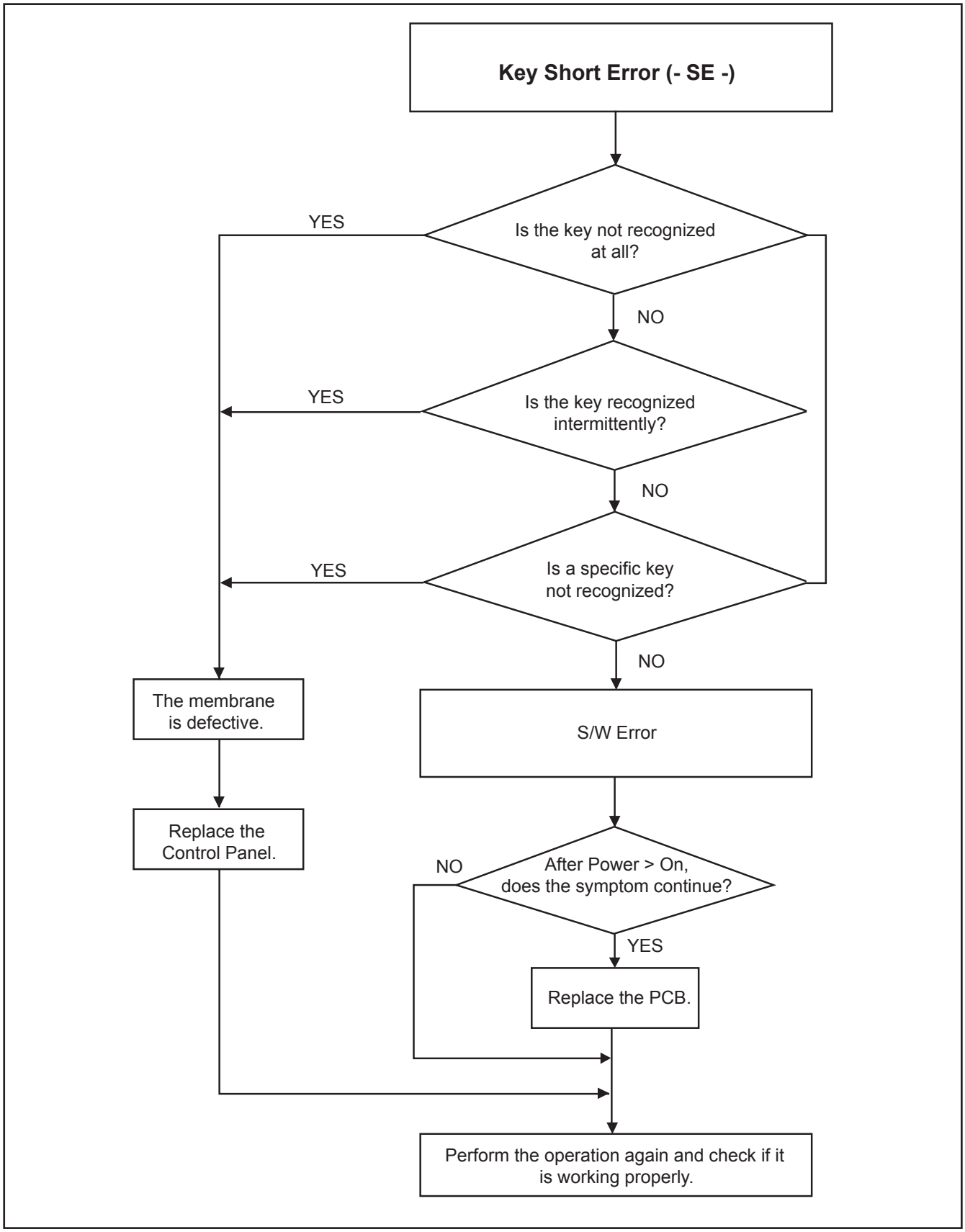
5-2-1 -SE-



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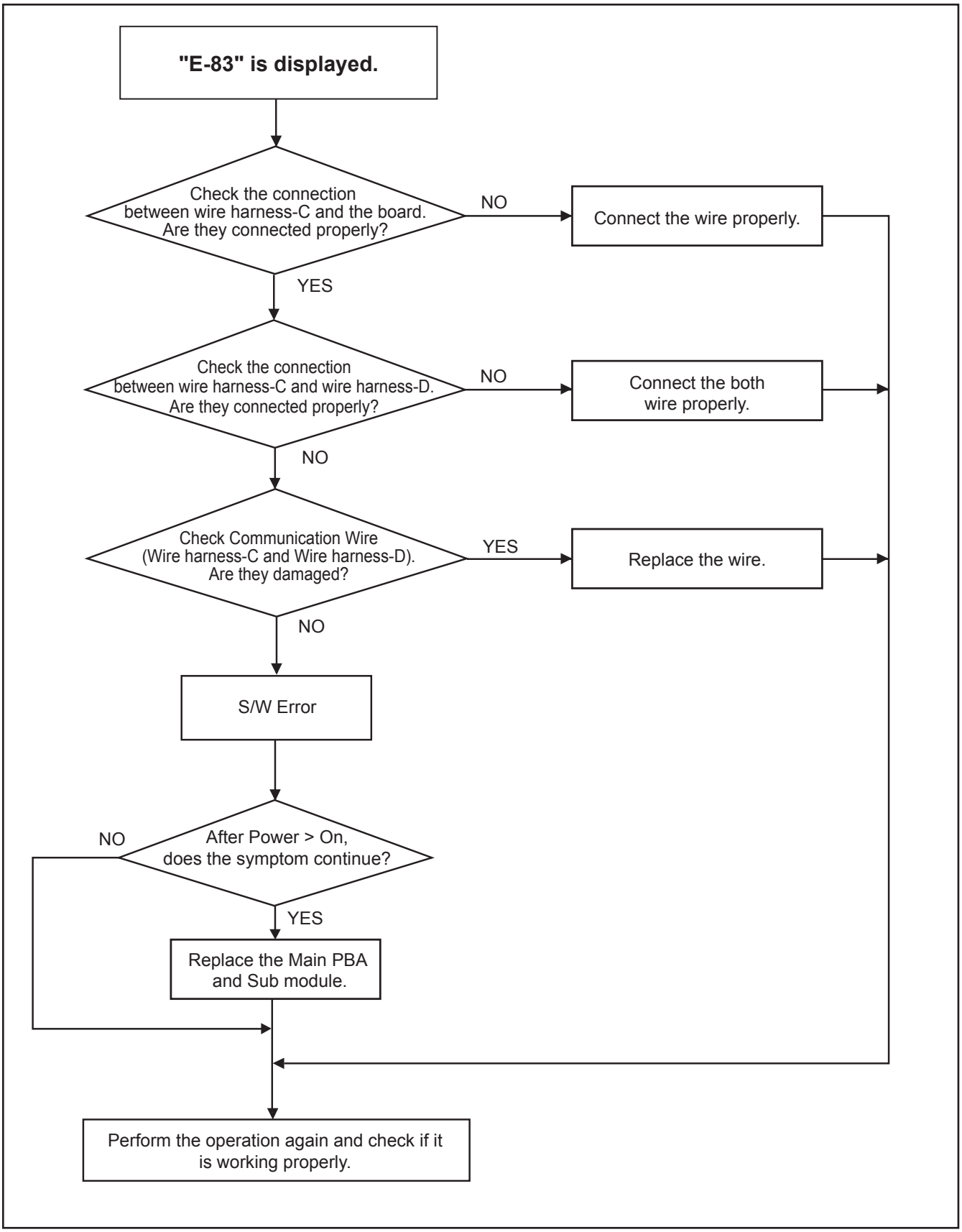
5-2-2 Communication Error between Main PCB and Sub PCB



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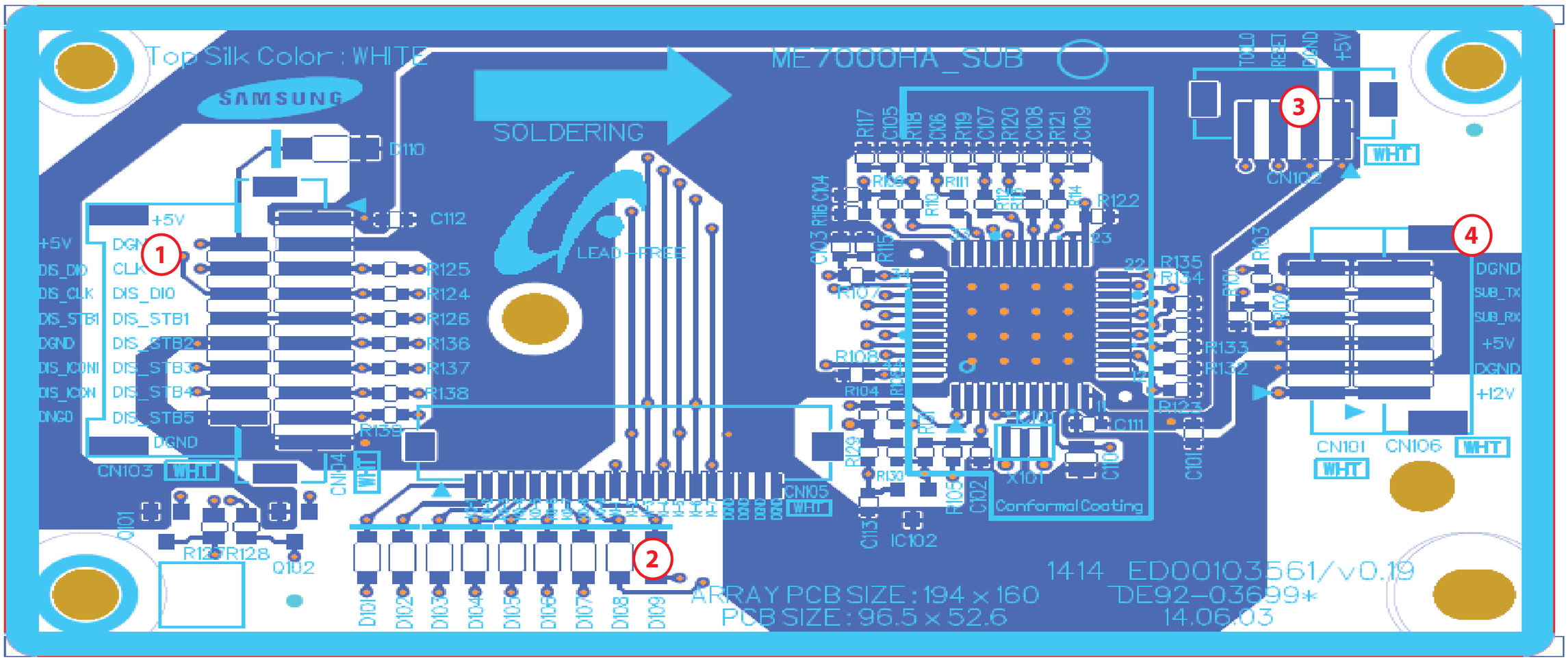
6-1-1. PCB Diagrams (SUB MODULE)



No	Part Number	Part name	Function and Rule
1	CN103	LED Display Connector	Connect LED Display
2	CN105	SUB Module Connector	A Terminal for SUB Module
3	CN102	On Board Writing Connector	When do Main MICOM revision, connect to MICOM writer. (No connetion at normal times.)
4	CN106	Main PBA Connector	Connect Main PBA

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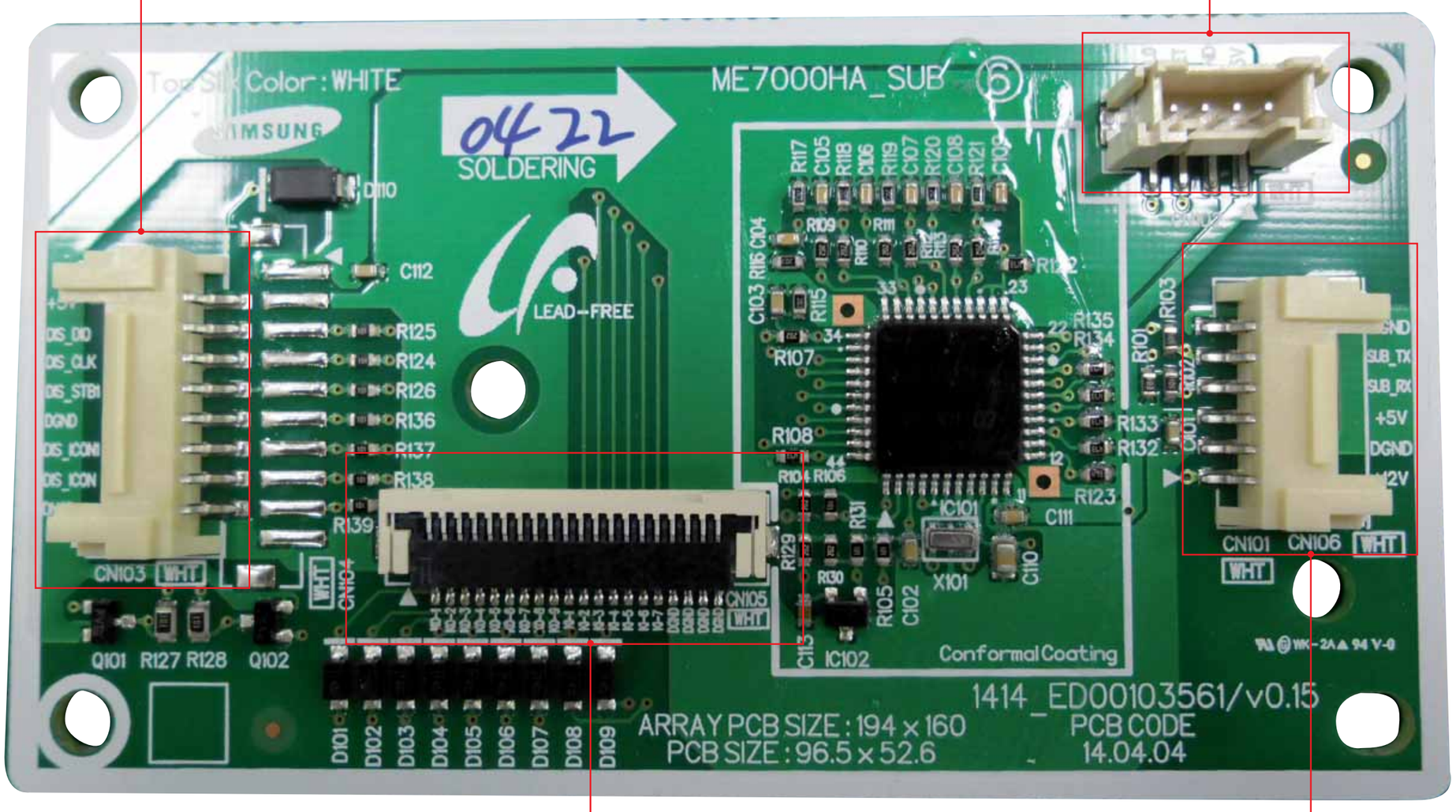
6-1-2. PCB Diagrams (SUB MODULE)

▶ CN901

1) LED Display Control 1
2) LED Display Control 2
3) LED Display Control 3
4) LED Display Control 4
5) LED Display Control 5
6) LED Display Control 6
7) LED Display Control 7
8) LED Display Control 8

▶ CN102

(MICOM PROGRAM UPDATE)
1) POWER (+5V)
2) POWER (GND, 0V)
3) RESET
4) TOOL0



▶ CN104

1) KEY OUTPUT 1
2) KEY OUTPUT 2
3) KEY OUTPUT 3
4) KEY OUTPUT 4
5) KEY OUTPUT 5
6) KEY OUTPUT 6
7) KEY OUTPUT 7
8) KEY OUTPUT 8
9) KEY OUTPUT 9
10) KEY INPUT 1
11) KEY INPUT 2
12) KEY INPUT 3
13) KEY INPUT 4
14) KEY INPUT 5
15) KEY INPUT 6
16) KEY INPUT 7

▶ CN701

1) +12V
2) GND
3) +5V
4) TX4-SUB
5) RX4-SUB
6) NO PIN

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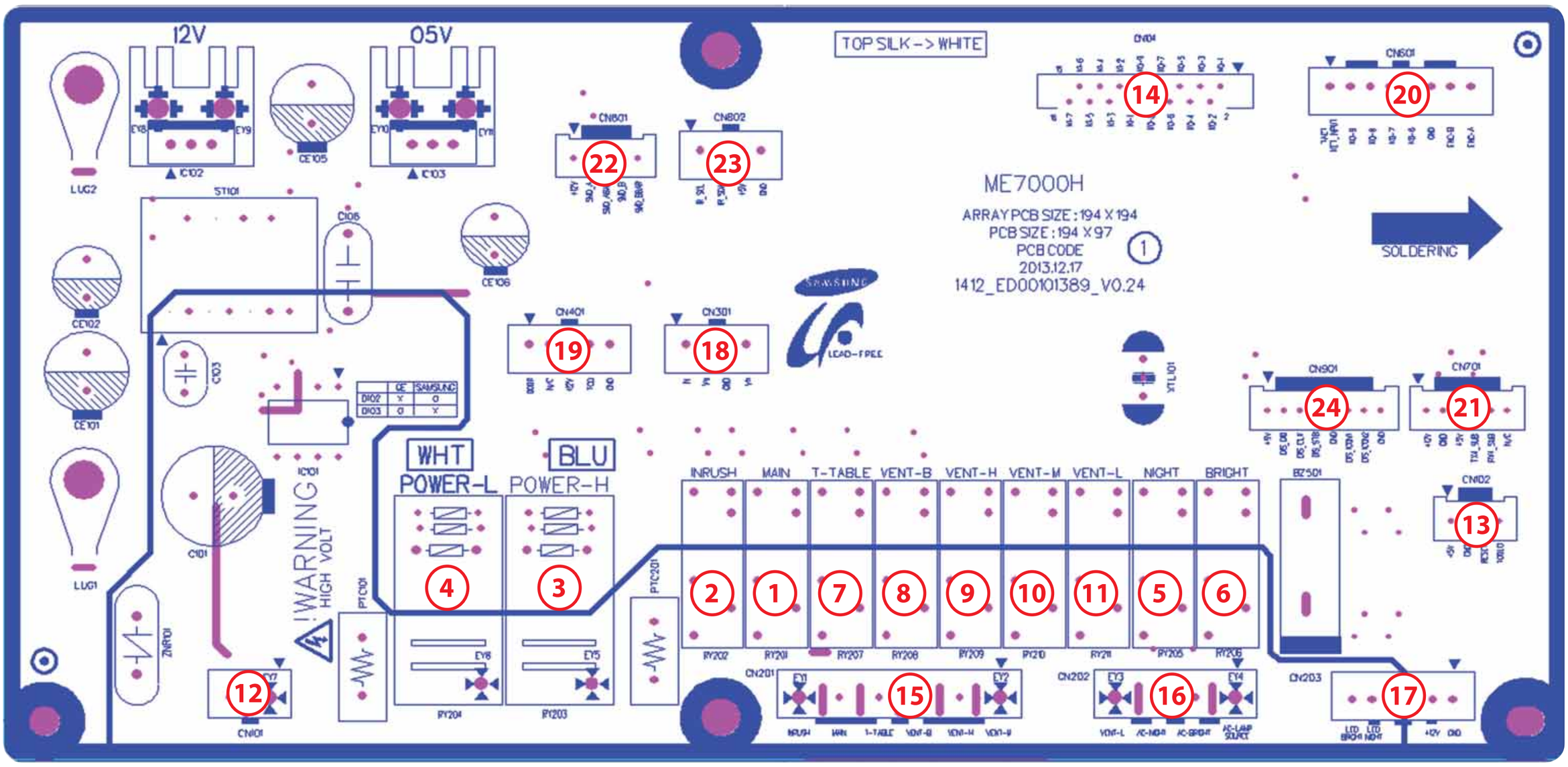
6-2-1. PCB Diagrams (MAIN PBA)



No	Part Number	Part name	Function and Rule
1	RY201	Main Relay	Fan, Lamp, T/T Control
2	RY202	Inrush Relay	Inrush Electric Current Decrease
3	RY203	Power High Relay	MW Power Control (High Power)
4	RY204	Power Low Relay	MW Power Control (Low Power)
5	RY205	Night Relay	Turn on Low Light
6	RY206	Bright Relay	Turn on High Light
7	RY207	Turn Table Relay	T/Table Motor Control
8	RY208	Vent Boost Relay	Turn on Boost Ventilation
9	RY209	Vent High Relay	Turn on High Ventilation
10	RY210	Vent Medium Relay	Turn on Medium Ventilation
11	RY211	Vent Low Relay	Turn on Low Ventilation
12	CN101	Power Connector	Conncet Power supply
13	CN102	On Board Writing Connector	When do MICOM revision, connect to MICOM writer. (No connection at normal times)
14	CN104	Membrane switch Connector	A terminal for membrane switch
15	CN201	Relay Connector	A Terminal for Relay Contact. (Inrush, Main, T/Table, Vent-Boost, Vent-High, Vent-Medium)
16	CN202	Relay Connector	A Terminal for Relay Contact. (Vent-Low, Cooktop Lamp(AC Lamp))
17	CN203	Relay Connector	A Terminal for Relay Contact. (Cooktop Lamp-Night(LED), Cooktop Lamp-Bright(LED))
18	CN301	Gas Sensor Connector	A Terminal for Gas Sensor
19	CN401	Sensing Connector	A Terminal for Door switch, TCO
20	CN601	Tact Switch & Encoder Connector	A Terminal for Tact switch and Encoder Module
21	CN701	LED Display Module Connector	A Terminal for LED Display Module
22	CN801	IR Sensor Connector 1	A Terminal for IR Sensor
23	CN802	IR Sensor Connector 2	A Terminal for IR Sensor
24	CN901	SUB Module Connector	A Terminal for SUB Module

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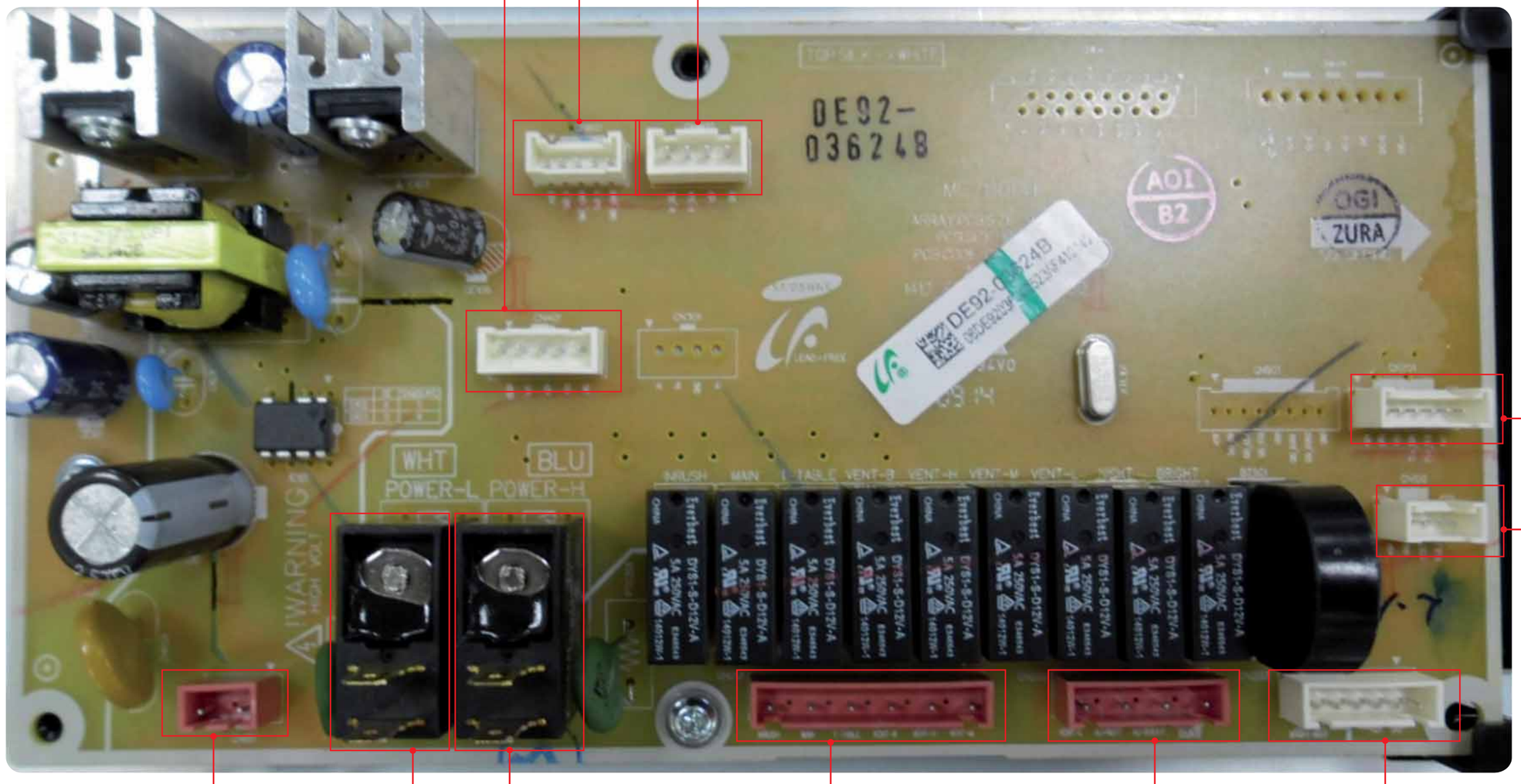
6-2-2. PCB Diagrams (MAIN PBA)

▶ CN401
1) DOOR SWITCH
2) NO PIN
3) +12V
4) TCO
5) GND

▶ CN801
1) +12V
2) MOTOR CONTROL1
3) MOTOR CONTROL2
4) MOTOR CONTROL3
5) MOTOR CONTROL4

▶ CN802
1) SENSOR CONTROL1
2) SENSOR CONTROL2
3) +5V
4) GND



▶ CN701
1) +12V
2) GND
3) +5V
4) TX4-SUB
5) RX4-SUB
6) NO PIN

▶ CN102
(MICOM PROGRAM UPDATE)
1) POWER (+5V)
2) POWER (GND, 0V)
3) RESET
4) TOOL0

▶ CN101
1) AC POWER (LIVE)
2) AC POWER (NEUTRAL)

▶ RY204
1) LOW POWER RELAY CONTACT-1
2) LOW POWER RELAY CONTACT-2

▶ RY203
1) HIGH POWER RELAY CONTACT-1
2) HIGH POWER RELAY CONTACT-2

▶ CN201
1) INRUSH
2) NO PIN
3) MAIN
4) NO PIN
5) T/TABLE
6) NO PIN
7) VENT BOOST
8) NO PIN
9) VENT HIGH
10) NO PIN
11) VENT MEDIUM

▶ CN202
1) VENT LOW
2) NO PIN
3) NO PIN
4) NO PIN
5) COOKTOP LAMP
6) NO PIN
7) COOKTOP LAMP SOURCE (AC VOLTAGE)

▶ CN203
1) GND
2) +12V
3) LED LAMP SOURCE
4) NO PIN
5) LED-NIGHT
6) LED-BRIGHT

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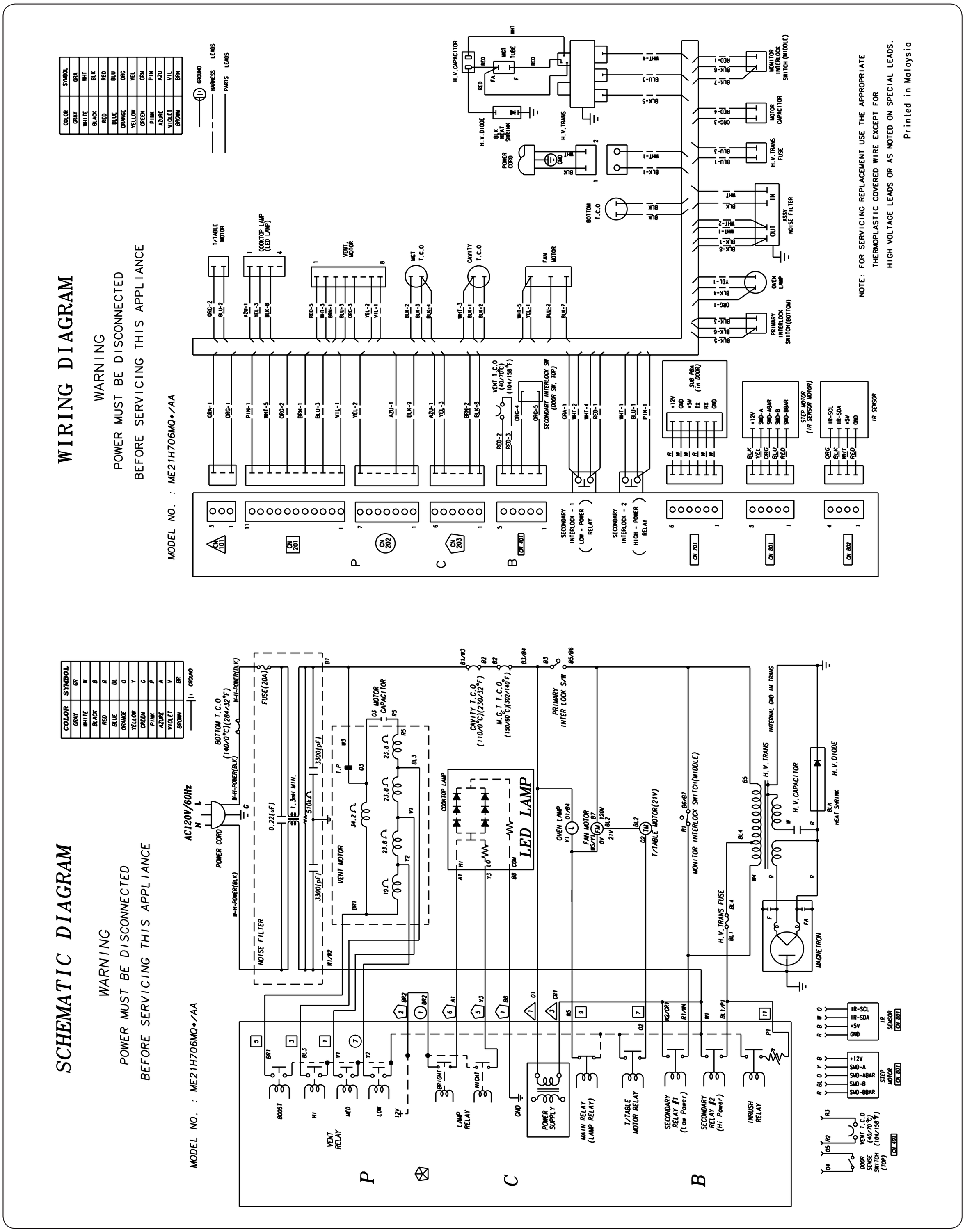
7-1 Wiring Diagrams



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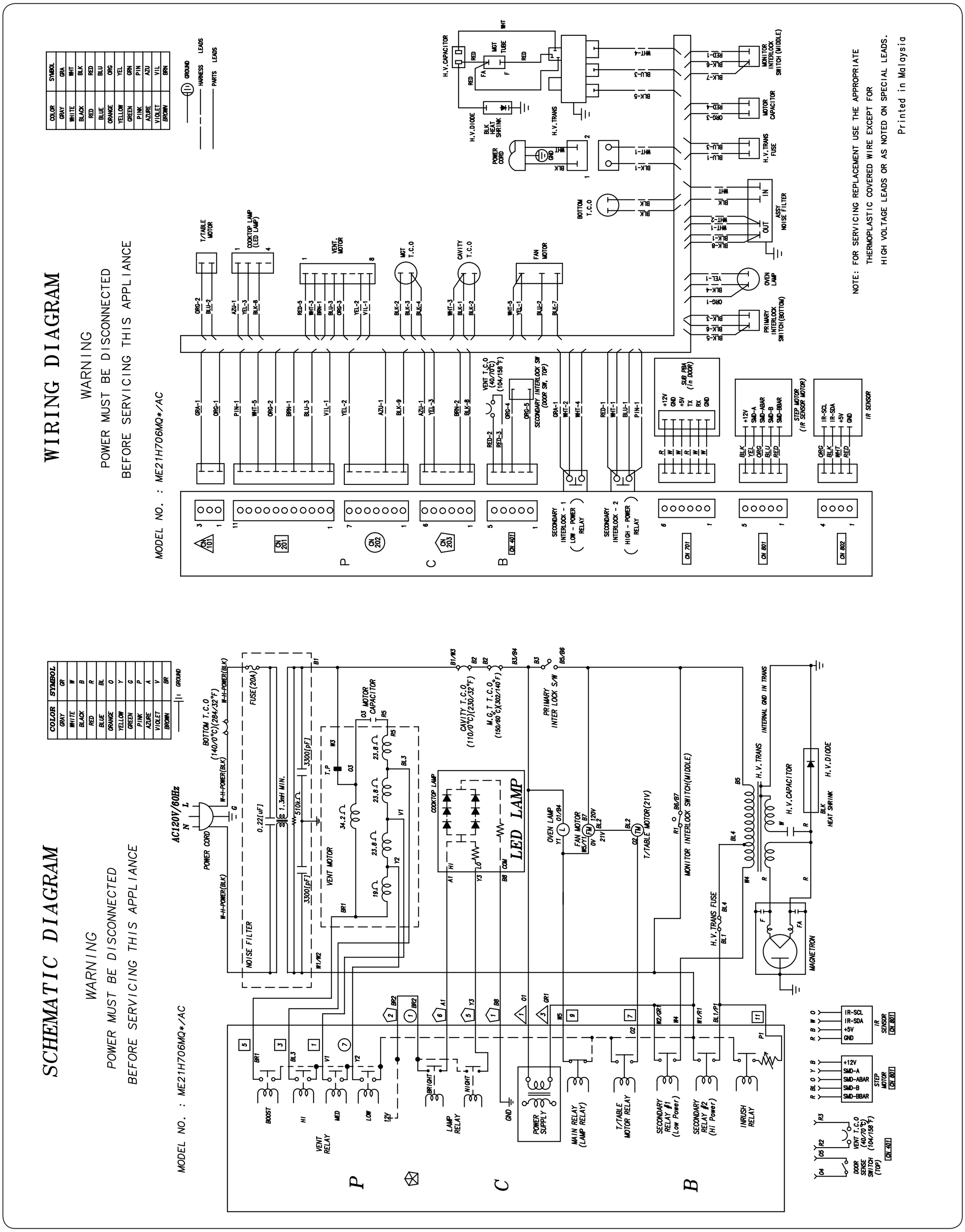
7-2 Wiring Diagram



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